Biotechnology and Bioengineering

Volume 55, 1997

July 5, 1997

1 Characterization of Acetone-Washed Yeast Biomass Functional Groups Involved in Lead Biosorption
R. Ashkenazy, L. Gottlieb, and S. Yannai

11 Simultaneous Measurement of Glucose and Glutamine in Insect Cell Culture Media by Near Infrared Spectroscopy
M.R. Riley, M. Rhiel, X. Zhou, M.A. Arnold, and D.W. Murhammer

16 Mechanism of Aluminum Interference on Uranium Biosorption by *Rhizopus arrhizus*
M. Tsezos, Z. Georgousis, and E. Remoudaki

28 Production of Poly(3-hydroxybutyrate) by High Cell Density Fed-Batch Culture of *Alcaligenes eutrophus* with Phosphate Limitation
H.W. Ryu, S.K. Hahn, Y.K. Chang, and H.N. Chang

33 Monitoring Toxicity in Anaerobic Digesters by the Rantox Biosensor: Theoretical Background
A. Rozzi, M.C. Tomei, A.C. Di Pinto, and N. Limoni

41 Expression of Cell Surface GPI-Anchored Human p97 in Baculovirus-Infected Insect Cells
M.L. Kennard, K.Y. Shimizu, R. Gabathuler, S. Rothenberger, D. Theilmann, and W.A. Jefferies

54 The Influence of Particle Size Distribution and Operating Conditions on the Adsorption Performance in Fluidized Beds
A. Karau, C. Benken, J. Thömmes, and M.-R. Kula

65 An Activity Coefficient Model for Proteins
S.M. Agena, I.D.L. Bogle, and F.L.P. Pessoas

72 Targeted Antisense Modulation of Inflammatory Cytokine Receptors
C.M. Roth, S.R. Reiken, J.M. Le Doux, S.B. Rajur, X.-M. Lu, J.R. Morgan, and M.L. Yarmush

82 Kinetics of Toluene Degradation by a Nitrate-Reducing Bacterium Isolated from a Groundwater Aquifer
J. Elmén, W. Pan, S.Y. Leung, A. Magyarosy, and J.D. Keasling

91 Protein Fouling During Microfiltration: Comparative Behavior of Different Model Proteins
S.T. Kelly and A.L. Zydney

101 Bidirectional Reaction Steps in Metabolic Networks: I. Modeling and Simulation of Carbon Isotope Labeling Experiments
W. Wiechert and A.A. de Graaf

118 Bidirectional Reaction Steps in Metabolic Networks: II. Flux Estimation and Statistical Analysis
W. Wiechert, C. Siefke, A.A. de Graaf, and A. Marx

136 Increasing GPI-Anchored Protein Harvest Concentrations from Suspension and Porous Microcarrier CHO Cell Cultures
R. Sunderji, J.M. Piret, and M.L. Kennard

148 Application of Numerical Modeling for the Development of Optimized Complex Medium for D-Hydantoinase Production from *Agrobacterium radiobacter* NRRL B 11291
A. Achary, K.A. Hariharan, S. Bandhyopadhyaya, R. Ramachandran, and K. Jayaraman

155 Biodegradation of Phenol at High Initial Concentrations in Two-Phase Partitioning Batch and Fed-Batch Bioreactors
L.D. Collins and A.J. Daugulis

163 Biodegradation of Paint Stripper Solvents in a Modified Gas Lift Hoop Bioreactor
L. Vanderberg-Twary, K. Steenhoudt, B.J. Travis, J.L. Hanners, T.M. Foreman, and J.R. Brainard

170 An On-Line Physiological State Recognition System for the Lysine Fermentation Process Based on a Metabolic Reaction Model
N. Takiguchi, H. Shimizu, and S. Shioya

182 Reductive Dechlorination of PCB-Contaminated Raisin River Sediments by Anaerobic Microbial Granules
M.R. Natarajan, J. Nye, W.-M. Wu, H. Wang, and M.K. Jain

191 Modeling Microbial Chemotaxis in a Diffusion Gradient Chamber
M.T. Widman, D. Emerson, C.C. Chiu, and R.M. Worden

206 Abrasion of Suspended Biofilm Pellets in Airlift Reactors: Effect of Particle Size
A. Gjaltema, M.C.M. van Loosdrecht, and J.J. Heijnen

216 Recombinant Microorganisms for Industrial Production of Antibiotics
B. Díez, E. Mellado, M. Rodríquez, R. Fouces, and J.-L. Barredo

227 Biocatalytic Polyester Synthesis: Analysis of the Evolution of Molecular Weight and End Group Functionality
A.K. Chaudhary, E.J. Beckman, and A.J. Russell

240 Erratum

July 20, 1997

241 Protein Production Using Recombinant Yeast in an Immobilized-Cell-Film Airlift Bioreactor
Z. Zhang, J. Scharer, and M. Moo-Young

252 Influence of the Nature of Modifier in the Enzymatic Activity of Chemical Modified Semipurified Lipase from *Candida rugosa*
M.J. Harnáiz, J.M. Sánchez-Montero, and J.V. Sinisterra

261 Surfactant as Modulating Agent of Enzyme-Loaded Liposome Activity
M.C. Annesini, C.M. Braguglia, A. Memoli, L.G. Palermiti, and S. Di Sario

267 Enzyme–Polyelectrolyte Complexes in Water–Ethanol Mixtures: Negatively Charged Groups Artificially Introduced into α-Chymotrypsin Provide Additional Activation and Stabilization Effects
E.V. Kudryashova, A.K. Gladilin, A.V. Vakurov, F. Heitz, A.V. Levashov, and Vadim V. Mozhaev

278 Functionalized Dendritic Polybenzylethers as Acid/Base Buffers for Biocatalysis in Nonpolar Solvents
M. Dolman, P.J. Halling, and B.D. Moore

283 Improvement of the Total Turnover Number and Space-Time Yield for Chloroperoxidase Catalyzed Oxidation
K. Seelbach, M.P.J. van Deurzen, F. van Rantwijk, R.A. Sheldon, and U. Kragl

289 Biomass Measurement by Inductive Permittivity
S.A. Siano

305 In Vivo Analysis of Metabolic Dynamics in *Saccharomyces cerevisiae*: I. Experimental Observations
U. Theobald, W. Mailinger, M. Baltes, M. Rizzi, and M. Reuss

317 Experimental Optimization of a Real Time Fed-Batch Fermentation Process Using Markov Decision Process
V.M. Saucedo and M.N. Karim

328 Fermentor Temperature as a Tool for Control of High-Density Perfusion Cultures of Mammalian Cells
S. Chuppa, Y.-S. Tsai, S. Yoon, S. Schackleford, C. Rozales, R. Bhat, G. Tsay, C. Matanguihan, K. Konstantinov, and D. Naveh

339 Pilot Scale Processing of Detergent-Based Aqueous Two-Phase Systems
T. Minuth, H. Gieren, U. Pape, H.C. Raths, J. Thömmes, and M.-R. Kula

348 Kinetic Resolution of α-Methylbenzylamine with ω-Transaminase Screened from Soil Microorganisms: Application of a Biphasic System to Overcome Product Inhibition
J.-S. Shin and B.-G. Kim

359 Polymerase Chain Reaction Engineering
J.T. Hsu, S. Das, and S. Mohapatra

367 Selection of Salt Hydrate Pairs for Use in Water Control in Enzyme Catalysis in Organic Solvents
E. Zacharis, I.C. Omar, J. Partridge, D.A. Robb, and P.J. Halling

375 Intracellular Kinetics of a Growing Virus: A Genetically Structured Simulation for Bacteriophage T7
D. Endy, D. Kong, and J. Yin

390 Site- and Branch-Specific Sialylation of Recombinant Human Interferon-γ in Chinese Hamster Ovary Cell Culture
X. Gu, B.J. Harmon, and D.I.C. Wang

399 Lipase Kinetics in Organic–Water Solvent with Amphipathic Substrate for Chiral Reaction
S.C. Mohapatra and J.T. Hsu

408 Accumulation of Lead by *Anabaena cylindrica*: Mathematical Modeling and an Energy Dispersive X-Ray Study
D.T. Swift and D. Forciniti

419 Design of Expression Systems for Metabolic Engineering: Coordinated Synthesis and Degradation of Glycogen
N. Dedhia, W. Chen, and J.E. Bailey

427 Sensor Fusion with On-Line Gas Emission Multisensor Arrays and Standard Process Measuring Devices in a Baker's Yeast Manufacturing Process
C.-F. Mandenius, T. Eklöv, and I. Lundström

439 Extension of Sp2/0 Hybridoma Cell Viability Through Interleukin-6 Supplementation
J.D. Chung, C. Zabel, A.J. Sinskey, and G. Stephanopoulos

447 Modeling the Growth and Proteinase A Production in Continuous Cultures of Recombinant *Saccharomyces cerevisiae*
M. Carlsen, K.V. Jochumsen, C. Emborg, and J. Nielsen

COMMUNICATION TO THE EDITOR

455 Novel Preparation Method for Surfactant-Lipase Complexes Utilizing Water in Oil Emulsions
S.-Y. Okazaki, N. Kamiya, K. Abe, M. Goto, and F. Nakashio

August 5, 1997

461 Enhancement of L(+)-Lactic Acid Production Using Mycelial Flocs of *Rhizopus oryzae*
Y. Kosakai, Y.S. Park, and M. Okabe

471 Unusual Salt and Solvent Dependence of a Protease from an Extreme Halophile
J. Kim and J.S. Dordick

480 Adsorption and Desorption of Pentachlorophenol on Cells of *Mycobacterium chlorophenolicum* PCP-1
S. Brandt, A.-P. Zeng, and W.-D. Deckwer

490 Kinetics of U(VI) Reduction by a Dissimilatory Fe(III)-Reducing Bacterium under Non-Growth Conditions
M.J. Truex, B.M. Peyton, N.B. Valentine, and Y.A. Gorby

497 On-Line Monitoring of Glucose in Mammalian Cell Culture Using a Flow Injection Analysis (FIA) Mediated Biosensor
K.B. Male, P.O. Gartu, A.A. Kamen, and J.H.T. Luong

505 Tc(VII) Reduction and Accumulation by Immobilized Cells of *Escherichia coli*
J.R. Lloyd, C.L. Harding, and L.E. Macaskie

511 Kinetic Characterization of Mass Transfer Limited Biodegradation of a Low Water Soluble Gas in Batch Experiments—Necessity for Multiresponse Fitting
B. De heyder, P. Vanrolleghem, H. Van Langenhove, and W. Verstraete

520 The Extent to which External Oxygen Transfer Limits Growth in Shake Flask Culture of Hairy Roots
K. Kanokwaree and P.M. Doran

527 Transient Studies of Nutrient Uptake, Growth, and Indole Alkaloid Accumulation in Heterotrophic Cultures of Hairy Roots of *Catharanthus roseus*
R. Bhadra and J.V. Shanks

535 Kinetic Studies on Hybridoma Cells Immobilized in Fixed Bed Reactors
R. Pörtner, S. Rössing, M. Koop, and I. Lüdemann

542 Antiserum Inhibition of Propagating Viruses
Y. Lee, S.D. Eisner, and J. Yin

547 Production of Recombinant Bacterial Endoglucanase as a Co-Product with Ethanol During Fermentation Using Derivatives of *Escherichia coli* KO11
B.E. Wood, D.S. Beall, and L.O. Ingram

556 Cumulative Sedimentation Analysis of *Escherichia coli* Debris Size
H.H. Wong, B.K. O'Neill, and A.P.J. Middelberg

COMMUNICATIONS TO THE EDITOR

565 Effect of Hypoosmotic Stress on Hybridoma Cell Growth and Antibody Production
J.S. Ryu and G.M. Lee

571 Model of Energy Uncoupling for Substrate-Sufficient Culture
Y. Liu and G.H. Chen

RAPID COMMUNICATION

577 Engineering mRNA Stability in *E. coli* by the Addition of Synthetic Hairpins Using a 5′ Cassette System
T.A. Carrier and J.D. Keasling

August 20, 1997

581 Application of Membrane-Based Preferential Transport to Whole Broth Processing
A. Agrawal and M. Burns

592 In Vivo Analysis of Metabolic Dynamics in *Saccharomyces cerevisiae:* II. Mathematical Model
M. Rizzi, M. Baltes, U. Theobald, and Matthias Reuss

609 A Novel Membrane Reactor Design for Controlled Studies of Interacting Populations (Simulation of the Interaction Between Microorganism and Plant Suspension Cultures)
L.J. Pestchanker and E.C. Ercoli

616 Application of Fluid Mechanic and Kinetic Models to Characterize Mammalian Cell Detachment in a Radial-Flow Chamber
A.S. Goldstein and P.A. DiMilla

630 Dynamics of Artificially Immobilized *Nitrosomonas europaea:* Effect of Biomass Decay
E.J.T.M. Leenen, A.A. Boogert, A.A.M. van Lammeren, J. Tramper, and R.H. Wijffels

642 High Pressure Disruption of Yeast Cells: The Use of Scale Down Operations for the Prediction of Protein Release and Cell Debris Size Distribution
S.F. Siddiqi, N.J. Titchener-Hooker, and P. Ayazi Shamlou

650 Laboratory Evaluation of a Two-Stage Treatment System for TCE Cometabolism by a Methane-Oxidizing Mixed Culture
L.H. Smith and P.L. McCarty

660 Specific ATP and Specific Oxygen Uptake Rate in Immobilized Cell Aggregates: Experimental Results and Theoretical Analysis Using a Structure-1 Model of Immobilized Cell Growth
P. Gikas and A.G. Livingston

674 Trichloroethylene Mineralization in a Fixed-Film Bioreactor Using a Pure Culture Expressing Constitutively Toluene *ortho*-Monooxygenase
A.K. Sun and T.K. Wood

686 Controlled Biomass Formation and Kinetics of Toluene Degradation in a Bioscrubber and in a Reactor with a Periodically Moved Trickle-Bed
S.-M. Wübker, A. Laurenzis, U. Werner, and C. Friedrich

RAPID COMMUNICATION

693 Real-Time Method for Determining the Colony-Forming Cell Content of Human Hematopoietic Cell Cultures
P.C. Collins, L.K. Nielsen, C.K. Wong, E.T. Papoutsakis, and W.M. Miller

September 5, 1997

701 A Model for Light Distribution and Average Solar Irradiance Inside Outdoor Tubular Photobioreactors for the Microalgal Mass Culture
F.G.A. Fernández, F.G. Camacho, J.A.S. Pérez, J.M.F. Sevilla, and E.M. Grima

715 Effect of Agitation Intensities on Fungal Morphology of Submerged Fermentation
Y.Q. Cui, R.G.J.M. van der Lans, and K.C.A.M. Luyben

727 Toxicity and Biodegradation of Formaldehyde in Anaerobic Methanogenic Culture
M. Qu and S.K. Bhattacharya

737 Linear Scale Ultrafiltration
R. van Reis, E.M. Goodrich, C.L. Yson, L.N. Frautschy, S. Dzengeleski, and H. Lutz

747 New Patterns of Mixed-Substrate Utilization During Batch Growth of *Escherichia coli* K12
A. Narang, A. Konopka, and D. Ramkrishna

758 An Indirect Optimization Method for Biochemical Systems: Description of Method and Application to the Maximization of the Rate of Ethanol, Glycerol, and Carbohydrate Production in *Saccharomyces cerevisiae*
N.V. Torres, E.O. Voit, C. Glez-Alcón, and F. Rodríguez

773 Kinetic Modeling of Poly(β-hydroxybutyrate) Production and Consumption by *Paracoccus pantotrophus* under Dynamic Substrate Supply
M.A. van Aalst-van Leeuwen, M.A. Pot, M.C.M. van Loosdrecht, and J.J. Heijnen

783 Fed-Batch Culture of Recombinant NS0 Myeloma Cells with High Monoclonal Antibody Production
W. Zhou, C.-C. Chen, B. Buckland, and J. Aunins

793 Cell Size Distribution as a Parameter for the Predetermination of Exponential Growth During Repeated Batch Cultivation of CHO Cells
T. Seewöster and J. Lehmann

798 Water Activity and Substrate Concentration Effects on Lipase Activity
E. Wehtje and P. Adlercreutz

807 Thermophilic Sulphate and Sulphite Reduction in Lab-Scale Gas-Lift Reactors Using H_2 and CO_2 as Energy and Carbon Source
R.T. van Houten, S.Y. Yun, and G. Lettinga

COMMUNICATION TO THE EDITOR

815 Application of Self-Cycling Fermentation Technique to the Production of Poly-β-Hydroxybutyrate
P. Marchessault and J.D. Sheppard

September 20, 1997

821 Effect of Substrate Concentration and Nitrate Inhibition on Product Release and Heavy Metal Removal by a *Citrobacter* sp.
P. Yong and L.E. Macaskie

831 Modeling Isotopomer Distributions in Biochemical Networks Using Isotopomer Mapping Matrices
K. Schmidt, M. Carlsen, J. Nielsen, and J. Villadsen

841 Lactic Acid Fermentation in a Recycle Batch Reactor Using Immobilized *Lactobacillus casei*
A. Senthuran, V. Senthuran, B. Mattiasson, and R. Kaul

854 Very High-Level Production and Export in *Escherichia coli* of a Cellulose Binding Domain for Use in a Generic Secretion-Affinity Fusion System
D. Hasenwinkle, E. Jervis, O. Kops, C. Liu, G. Lesnicki, C.A. Haynes, and D.G. Kilburn

864 Metabolic and Physiological Studies of *Corynebacterium glutamicum* Mutants
S.M. Park, A.J. Sinskey, and G. Stephanopoulos

880 Adhesion and Biofilm Development on Suspended Carriers in Airlift Reacters: Hydrodynamic Conditions versus Surface Characteristics
A. Gjaltema, N. van der Marel, M.C.M. van Loosdrecht, and J.J. Heijnen

890 A Mathematical Model of N-Linked Glycoform Biosynthesis
P. Umaña and J.E. Bailey

909 Comparison of *Trichoplusia ni* BTI-Tn-5B1-4 (High Five™) and *Spodoptera frugiperda* Sf-9 Insect Cell Line Metabolism in Suspension Cultures
M. Rhiel, C.M. Mitchell-Logean, and D.W. Murhammer

921 On-Line Green Fluorescent Protein Sensor with LED Excitation
L. Randers-Eichhorn, C.R. Albano, J. Sipior, W.E. Bentley, and G. Rao

RAPID COMMUNICATION

927 A Novel Cytostatic Process Enhances the Productivity of Chinese Hamster Ovary Cell
M. Fussenegger, X. Mazur, and J.E. Bailey